



**Rules and
Regulations for
the Classification
of Ships, July 2011**

Notice No. 2

Effective Date of Latest
Amendments:

See page 1

Issue date: November 2011

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RULES AND REGULATIONS FOR THE CLASSIFICATION OF SHIPS, *July 2011*

Notice No. 2

This Notice contains amendments within the following Sections of the *Rules and Regulations for the Classification of Ships, July 2011*. The amendments are effective on the dates shown:

Part	Chapter	Section	Effective date
1	2	2, 3	1 January 2012
1	3	1, 2, 5, 22	1 January 2012
3	1	8	1 January 2012
3	13	8	1 January 2012
4	1	9	Corrigendum
4	11	1, 10	1 January 2012
8	2	3, 4, 10	1 January 2012

It will be noted that the amendments also include corrigenda, which are effective from the date of this Notice.

The *Rules and Regulations for the Classification of Ships, July 2011* are to be read in conjunction with this Notice No. 2. The status of the Rules is now:

Rules for Ships	Effective date:	July 2011
Notice No. 1	Effective dates:	1 July 2011
Notice No. 2	Effective dates:	1 January 2012 & Corrigendum

Part 1, Chapter 2

Classification Regulations

Effective date 1 January 2012

■ Section 2

Character of classification and class notations

2.2 Character symbols

2.2.1 All ships, when classed, will be assigned one or more character symbols as applicable. For the majority of ships, the character assigned will be **100A1**, ~~✱100A1~~ or ~~✱100A1~~.

2.6 Class notations (Environmental Protection)

2.6.1 The following class notations are associated with the design and operation of a ship and may be assigned as considered appropriate by the Classification Committee, on application from the Owners:

~~EP~~ **ECO** This notation will be assigned when a ship is designed and operated in accordance with the relevant requirements of the Rules.

~~EP~~ **ECO(TOC)** This notation will be assigned when the environmental protection arrangements are in accordance with the requirements of another recognised classification society and are essentially equivalent to Rule requirements and the ship is operated in accordance with the relevant requirements of the Rules.

2.7 Descriptive notes

2.7.5 **EDD**. Vessel is eligible for the Owner/Operator to apply to the Flag Administration for the vessel to be placed on a pilot Extended Dry-Docking regime. The relevant Flag Administration may elect to impose requirements additional to those defined as per this descriptive note. Vessels are to comply with the LR Guidance notes on Extended Dry-Dockings.

■ Section 3

Surveys – General

3.4 Damages, repairs and alterations

3.4.8 Where a complete replacement or addition of a major portion of the ship is involved, as defined in 3.4.9, consideration may be given to assignment of a separate date of build for the new structure. The Survey requirements shall be based on the date of build associated with each major portion of the ship. Special Survey due dates may be aligned at the discretion of the Committee.

3.4.9 A major portion of the ship may include a complete forward or after section, a complete main cargo section (which may include a complete hold/tank of a cargo ship), a complete block of deck structure of a passenger ship or a structural modification of a single hull to a double hull ship.

Part 1, Chapter 3

Periodical Survey Regulations

Effective date 1 January 2012

■ Section 1

General

1.8 Repairs

1.8.3 Where the damage found on structure mentioned in 1.8.1 is isolated and of a localised nature which does not affect the ship's structural integrity, consideration may be given by the Surveyor to allow an appropriate temporary repair to restore watertight or weathertight integrity and impose a Condition of Class with a specific time limit.

■ Section 2

Annual Surveys – Hull and machinery requirements

2.2 Annual Surveys

(Part only shown)

2.2.37 ~~For roll on-roll off ships and other ship types fitted with bow doors, inner doors, side doors and stern doors, in addition to the requirements of 2.2.1, the following are to be satisfactorily dealt with as applicable:~~ For **roll on-roll off ships** (i.e., those that utilise a loading ramp which enables wheeled vehicles to be rolled on and rolled off the ship), in addition to the requirements of 2.2.1, the requirements of Section 22 are to be complied with, as applicable. For ships other than roll on-roll off ships, fitted with bow doors, inner doors, side doors and stern doors, in addition to the requirements of 2.2.1, the following are to be satisfactorily dealt with, as applicable:

Section 5

Special Survey – General – Hull requirements

5.1 General

5.1.7 For roll on-roll off ships (i.e., those fitted with a loading ramp which enables wheeled vehicles to be rolled on and rolled off the ship), in addition to the requirements of this Section, the requirements of Section 22 are to be complied with, as applicable.

Section 22

Bow, inner, side shell and stern doors on Ro-Ro ships

22.1 General

22.1.1 The requirements of Sections 2 to 5 are to be complied with, as applicable.

22.1.2 The requirements in this Section are applicable to the survey of bow, inner, side shell and stern doors on roll on-roll off passenger (Ro-Pax) ships and roll on-roll off (Ro-Ro) cargo ships.

22.1.3 Annual Survey and Special Survey of bow, inner, side shell and stern doors are to include examinations, tests and checks to a sufficient extent in order to verify that they are in satisfactory condition, remain in compliance with applicable requirements, and are subject to proper maintenance and operation in accordance with the Operation and Maintenance Manual (OMM) or manufacturer's recommendations.

22.2 Definitions

22.2.1 For the application of the requirements in this Section, a **Ro-Ro ship** is a ship that utilises a loading ramp to enable wheeled vehicles to be rolled on and rolled off the ship.

22.2.2 A **Ro-Pax ship** is a passenger ship with Ro-Ro spaces or special category spaces.

22.2.3 **Ro-Ro spaces** are those that extend over a substantial length or the entire length of the ship, and are not normally sub-divided. These spaces can be loaded and unloaded (normally in a horizontal direction) with motor vehicles with fuel in their tanks for their own propulsion and/or goods (either packaged or in bulk, in rail or road cars (including tankers), trailers, containers, pallets, demountable tanks or in other stowage units or receptacles).

22.2.4 **Special category spaces** are enclosed vehicle spaces (above or below the bulkhead deck) that vehicles can be driven on to and from, and that can be accessed by passengers. Special category spaces may be accommodated on more than one deck, provided that the total overall clear height for vehicles does not exceed 10 m.

22.2.5 **Securing devices** are used to keep the door closed by preventing it from rotating about its hinges.

22.2.6 **Supporting devices** are used to transmit external or internal loads from the door to a securing device and from the securing device to the ship's structure, or a device other than a securing device, such as a hinge, stopper or other fixed device, that transmits loads from the door to the ship's structure.

22.2.7 A **locking device** is used to lock a securing device in the closed position.

22.2.8 A **Close-up Survey** is defined in 1.5.

22.3 Annual Surveys

22.3.1 The survey is to consist of an examination to verify, as far as is practicable, that the bow, inner, side shell and stern doors are maintained in a satisfactory condition.

22.3.2 The Surveyor is to obtain confirmation that no unapproved changes have been made to the bow, inner, side shell and stern doors since the last survey.

22.3.3 Where applicable, Surveyors are to verify that the Operation and Maintenance Manual (OMM), including any revisions, is available on board. It is to be verified that documented operating procedures for closing and securing the doors are kept on board and posted at the appropriate place(s). The Surveyor is to apply particular attention to the register of inspections and its contents (contained within the OMM) as a basis for the survey.

22.3.4 An examination of the bow, inner, side shell and stern doors is to be carried out, with particular attention to be applied to the following:

- The structural arrangement of doors, including plating, secondary stiffeners, primary structure, hinging arms and weld connections;
- Shell structure surrounding the opening of the doors and the securing, supporting and locking devices, including shell plating, secondary stiffeners, primary structure and associated weld connections;
- Hinges and bearings, thrust bearings;
- Hull and door side supports for securing, supporting and locking devices.

NOTE

If a crack is identified, an examination by non-destructive testing is to be carried out in the surrounding area and for similar items, as considered necessary by the Surveyor.

22.3.5 A Close-up Survey of the securing, supporting and locking devices is to be carried out. As a minimum, the Close-up Survey is to include the following:

- Cylinder securing pins, supporting brackets, back-up brackets (where fitted) and their weld connections;
- Hinge pins, supporting brackets, back-up brackets (where fitted) and their weld connections;
- Locking hooks, securing pins, supporting brackets, back-up brackets (where fitted) and their weld connections;
- Locking pins, supporting brackets, back-up brackets (where fitted) and their weld connections;

- (e) Locating and stopper devices and their weld connections.

22.3.6 The clearances of hinges, bearings and thrust bearings are to be measured where no dismantling is required. If the function test is not satisfactory, dismantling may be required to measure the clearances. If dismantling is carried out, a visual examination of hinge pins and bearings, together with non-destructive testing of the hinge pin, is to be carried out. The clearances of the securing, supporting and locking devices are to be measured, where indicated in the Operation and Maintenance Manual (OMM).

22.3.7 An examination of the sealing arrangements, including packing material/rubber gaskets, retaining bars or channels and associated weld connections, is to be carried out.

22.3.8 An examination of the drainage arrangements, including bilge wells and drain pipes, where fitted, is to be carried out. A test of the bilge system between the inner and outer doors is to be carried out.

22.3.9 A function test of doors is to be carried out. The Surveyor is to check the satisfactory operation of the bow, inner, side shell and stern doors during a complete opening and closing operation including, as applicable:

- (a) Proper working of the hinging arms and hinges;
- (b) Proper engagement of the thrust bearings;
- (c) Device for locking the door in the open position;
- (d) Securing, supporting and locking devices;
- (e) Proper sequence of the interlock system for the opening/closing system and the securing and locking devices;
- (f) Mechanical lock of the securing devices;
- (g) Proper locking of hydraulic securing devices in the event of a loss of the hydraulic fluid, according to the procedure contained in the Operation and Maintenance Manual (OMM);
- (h) Correct indication of open/closed position of doors and securing/locking devices at navigation bridge and other control stations;
- (j) Isolation of the hydraulic securing/locking devices from other hydraulic systems;
- (k) Confirmation that the operating panels are inaccessible to unauthorised persons;
- (l) Verification that a notice plate giving instructions to the effect that all securing devices are to be closed and locked before leaving harbour is placed at each operating panel and supplemented by warning indicator lights;
- (m) Examination of electrical equipment for opening, closing and securing the doors.

22.3.10 A function test of the indicator system is to be carried out. The Surveyor is to check the satisfactory operation of the indicator system, where fitted, including the following, as applicable:

- (a) Proper visible indication and audible alarm on the navigation bridge panel, according to the selected function 'harbour/sea voyage' and on the operating panel;
- (b) Lamp test function on both panels;
- (c) Verification that it is not possible to turn off the indicator light on both panels;
- (d) Verification of fail safe performance, according to the procedure contained in the Operation and Maintenance Manual (OMM);

- (e) Confirmation that power supply for the indicator system is supplied by the emergency source or other secure power supply and is independent of the power supply for operating the doors;
- (f) Proper condition of sensors and protection from water, ice formation and mechanical damage.

22.3.11 A test of the water leakage detection system, where fitted, is to be carried out. The test is to include verification of a proper audible alarm on the navigation bridge panel and on the engine control room panel, according to the procedure contained in the Operation and Maintenance Manual (OMM).

22.3.12 A test of the television surveillance system, where fitted, is to be carried out. The test is to include verification of a proper indication on the navigation bridge monitor and on the engine control room monitor.

22.3.13 A hose test, or equivalent, is to be carried out. If the results of the visual examination and function test are satisfactory, the tightness test need not be carried out unless considered necessary by the Surveyor.

22.3.14 Following the visual examinations and function tests, non-destructive testing and thickness measurements may be required as considered necessary by the Surveyor.

22.4 Special Surveys

22.4.1 The requirements of 22.3 are to be complied with as applicable.

22.4.2 The securing, supporting and locking devices, including their weld connections, are to be subjected to non-destructive testing and thickness measurement to the extent considered necessary by the Surveyor. The maximum allowable diminution is 15 per cent of the as-built thickness.

22.4.3 The effectiveness of the sealing arrangements is to be verified by carrying out a hose test, or equivalent.

22.4.4 The clearances of hinges, bearings and thrust bearings are to be measured. Unless otherwise specified in the Operation and Maintenance Manual (OMM), or by the manufacturer's recommendation, the measurement of clearances may be limited to representative bearings where dismantling is needed in order to measure the clearances. If dismantling is carried out, a visual examination of hinge pins and bearings, together with non-destructive testing of the hinge pin, is to be carried out.

22.4.5 The non-return valves of the drainage system are to be dismantled and examined.

Part 3, Chapter 1

General

Effective date 1 January 2012

■ Section 8

Inspection, workmanship and testing procedures

8.3 Testing procedures

Table 1.8.1 **Testing requirements** (Part only shown)

Item to be tested	Testing procedure	Testing requirement
Chain locker, if aft of collision bulkhead	Structural	Head of water up to the top The greater of: • head of water up to the top of the spurling pipe • head of water up to the exposed weather deck

Part 3, Chapter 13

Ship Control Systems

Effective date 1 January 2012

■ Section 8

Windlass design and testing

8.10 Structural requirements associated with anchoring

8.10.5 Where means of access is provided to the chain locker it is to be closed by a substantial cover and secured by closely spaced bolts. Where a means of access to spurling pipes or cable lockers is located below the weather deck, the access cover and its securing arrangements are to be in accordance with ISO 5894-1999, or an equivalent National Standard acceptable to LR, recognised standards or equivalent for watertight manhole covers. Butterfly nuts and/or hinged bolts are prohibited as the securing mechanism for the access cover.

In line with 'correction 1, August 2011' agreed by IACS to Rev.3 of IACS Unified Requirement L4 'Closure of Chain Lockers', the following text is to be appended to the end of paragraph 8.10.7:

Examples of acceptable arrangements are:

- steel plates with cutouts to accommodate chain links, or
- canvas hoods with a lashing arrangement that maintains the cover in the secured position.

8.10.7 Spurling pipes are to be provided with permanently attached closing appliances to minimise water ingress. ~~It is recommended that steel plates in halves, hooked over the spurling pipe tops, be provided on top of which cement may be laid before lashing a canvas cover. Suitable alternatives will be considered.~~

Examples of acceptable arrangements are:

- steel plates with cutouts to accommodate chain links, or
- canvas hoods with a lashing arrangement that maintains the cover in the secured position.

Part 4, Chapter 1
General Cargo Ships

CORRIGENDUM

■ Section 9
Bulkheads

9.2 Watertight and deep tank bulkheads

Table 1.9.1 Watertight and deep tank bulkhead scantlings (Part only shown)

Item and requirement	Watertight bulkheads	Deep tank bulkheads
(2) Modulus of rolled and built stiffeners, swedges, double plate bulkheads and symmetrical corrugations	$Z = \frac{s k h_4 l_e^2}{71\gamma (\omega_1 + \omega_2 + 2)} \text{ cm}^3$	$Z = \frac{\rho s k h_4 l_e^2}{22\gamma \frac{1,025}{1,025} (\omega_1 + \omega_2 + 2)} \text{ cm}^3$

Part 4, Chapter 11
Ore Carriers

Effective date 1 January 2012

■ Section 1
General

1.1 Application

1.1.3 The scantlings of structural items may be determined by direct calculation. Where the length of the ship exceeds 150 m, the scantlings of the primary supporting structure are to be assessed by direct calculation and the application of ShipRight notations SDA and CM are mandatory and the fatigue performance of structural details are to be assessed in accordance with the relevant ShipRight procedures, see 1.3.3. In such cases, the calculations are to be submitted for approval.

1.3 Class notation

1.3.3 The ShipRight 'Structural Design Assessment' (SDA), 'Fatigue Design Assessment' (FDA) and 'Construction Monitoring' (CM) procedures are mandatory for ships with length, *L*, exceeding 150 m and for ships of abnormal hull-form, or of unusual structural configuration or complexity, see Section 10.

~~1.3.3~~ 1.3.4 The Regulations for classification and the assignment of class notations are given in Pt 1, Ch 2,2.

■ Section 10
Direct calculations

10.1 Application

10.1.4 The cross-deck structure is to be verified as being capable of supporting transverse compressive stresses resulting from lightship weight, ~~cargo weight and inertia~~ deadweight, hydrostatic and wave loads. For ore carriers that are designed to operate with an asymmetrical loading condition, or large ore carriers with *B* ≥ 40 m or *b/w* ≥ 2,2, the wave loads should take account of hydrodynamic torque in an oblique sea. The cross-deck structure is to comprise the hatch coamings and beams, the plating and attached stiffeners and the upper stool. Non-corrugated bulkhead plating may also be included

where

- B* = moulded breadth, in metres
- b* = breadth of the deck hatch openings, in metres
- w* = width of the cross-deck strip between hatchways, in metres.

Part 8, Chapter 2

Ice Operations – Ice Class

Effective date 1 January 2012

Section 3

General machinery requirements for navigation in ice – All Ice Classes

3.3 Ship-side valves

3.3.1 The sea inlet and overboard discharge valves which are situated at or below the maximum Load Line, are to be provided with low pressure steam or compressed air connection for clearing purposes, see Pt 5, Ch 13. Provisions need not be applied for the discharge from the main engine and central cooling water system for first-year and multi-year ice classes.

Section 4

Hull requirements for light ice conditions – Ice Classes 1D and 1E

4.2 Ice Class 1E – General

4.2.2 The requirements for shell plating need only be applied in the shaded region shown in Fig. 2.4.1. The requirements for framing need only be applied forward of the flat of side.

4.2.2 4.2.3 For longitudinally framed ships, the scantlings of shell plating and framing are to comply with the requirements of **Ice Class 1C FS** using 0,9 times the ice pressure. The requirements for shell plating need only be applied in the region shown in Fig. 2.4.1. The requirements for framing need only be applied forward of the flat of side.

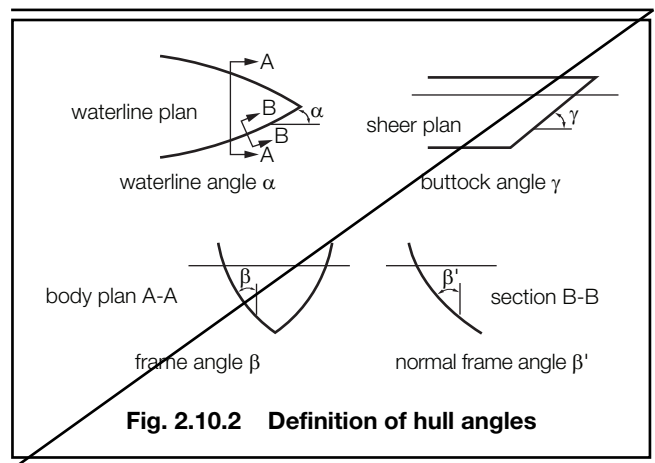
4.2.3 4.2.4 For transversely framed ships, the requirements of 4.3 to 4.7 are to be applied.

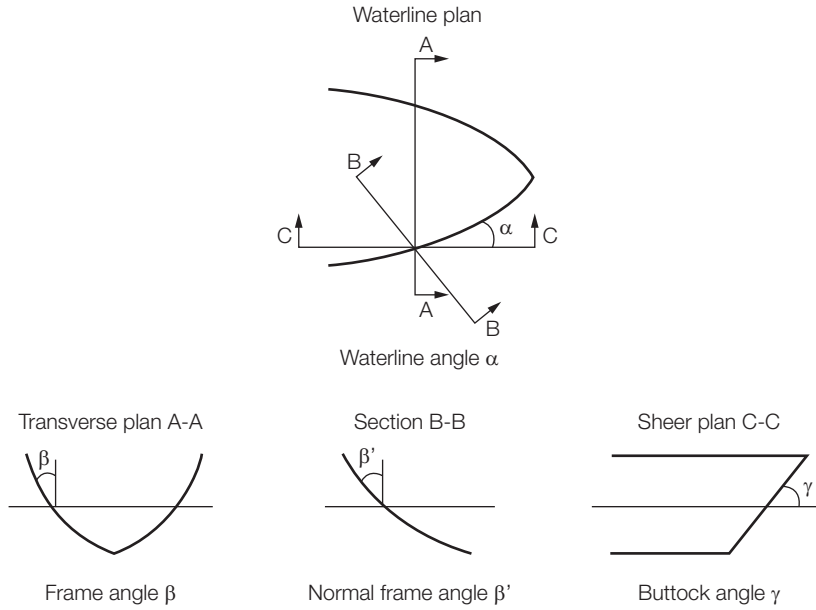
4.2.4 4.2.5 Where the structural requirements of **Ice Class 1C FS** give lesser scantlings than the requirements of this sub-Section, the lesser scantlings may be applied.

Section 10

Hull strengthening requirements for navigation in multi-year ice conditions – Ice Classes PC1, PC2, PC3, PC4, PC5, PC6 and PC7

10.4 Bow area





where
 β' = normal frame angle at upper ice waterline, in degrees
 α_s = upper ice waterline angle, in degrees
 γ = buttock angle at upper ice waterline (angle of buttock line measured from horizontal), in degrees
 $\tan(\beta) = \frac{\tan(\alpha)}{\tan(\gamma)}$
 $\tan(\beta') = \tan(\beta) \cos(\alpha)$

Fig. 2.10.2 Definition of hull angles

(Part only shown)

10.4.3 The bow area load characteristics are determined as follows:

- (a) The shape coefficient, f_{a_i} , is to be taken as
 L = ship length measured at, as defined in Pt 3, Ch 1.6.1.1, but measured on the upper ice waterline (UIWL), in metres

10.10 Framing – General

(Part only shown)

10.10.8 When the cross-sectional area of the attached plate flange exceeds the cross-sectional area of the local frame, the actual net effective plastic section modulus, Z_p , is given by:

A_{pn} = net cross-sectional area of attached plate the local frame, in cm^2 (equal to $10s t_{pn}$, but not to be taken greater than the net cross-sectional area of the local frame)

10.10.9 When the cross-sectional area of the local frame exceeds the cross-sectional area of the attached plate flange, the plastic neutral axis is located a distance z_{na} above the attached shell plate, given by:

$$z_{na} = \frac{100 A_{fn} + h_w t_{wn} - 1000 t_{pn} s}{2 t_{wn}} \text{ mm}$$

and the net effective plastic section modulus, Z_p , is given by:

$$Z_p = t_{pn} s \left(z_{na} \frac{t_{pn}}{2} \right) \sin \phi_w + \left(\frac{((h_w - z_{na})^2 + z_{na}^2) t_{wn} \sin \phi_w}{2000} + \frac{A_{fn} ((h_{fc} - z_{na}) \sin \phi_w - b_w \cos \phi_w)}{10} \right) \text{ cm}^3$$

10.14 Framing – Structural stability

10.14.3 In addition, the following is to be satisfied:

$$t_{wn} \geq 0,35 t_{pn} \sqrt{\frac{\sigma_y}{235}}$$

where

- σ_y = minimum upper yield stress of the material shell plate in way of the framing member, in N/mm^2
 t_{wn} = net thickness of the web, in mm
 t_{pn} = net thickness of the shell plate in way of the framing member, in mm.

10.16 Corrosion/abrasion additions and steel renewal

Table 2.10.6 Corrosion/abrasion additions for shell plating

Hull area	t_s , in mm					
	With effective protection			Without effective protection		
	PC1 to PC3	PC4 and PC5	PC6 and PC7	PC1 to PC3	PC4 and PC5	PC6 and PC7
Bow; Bow Intermediate Icebelt	3,5	2,5	2,0	7,0	5,0	4,0
Bow Intermediate Lower; Midbody & Stern Icebelt	2,5	2,0	2,0	5,0	4,0	3,0
Midbody and Stern Lower; Bottom	2,0	2,0	2,0	4,0	3,0	2,5
Other Areas	2,0	2,0	2,0	3,5	2,5	2,0

10.17 Materials

10.17.1 Plating materials for hull structures are to be not less than those given in Tables 2.10.8 to 2.10.11 based on the as-built thickness of the material, the Polar ice class notation assigned to the ship and the material class of structural members given in **Table 2.10.7** 10.17.2.

10.17.2 Material classes specified in Table 2.2.1 in Pt 3, Ch 2, are applicable to polar ships regardless of the ship's length. In addition, material classes for weather and sea exposed structural members and for members attached to the weather and sea exposed ~~shell~~ plating of polar ships are given in Table 2.10.7. Where the material classes in Table 2.10.7 and those in Table 2.2.1 in Pt 3, Ch 2 differ, the higher material class is to be applied.

Table 2.10.7 Material classes for structural members of polar ships (Part only shown)

Structural members	Material Class
All inboard framing members attached to the weather and sea-exposed plating including any contiguous inboard member within 600 mm of the ~~shell~~ plating	I

10.19 Design vertical ice force at the bow

(Part only shown)

10.19.1 The design vertical ice force at the bow, F_{IB} , is to be taken as the lesser of $F_{IB,1}$ or $F_{IB,2}$:

K_f = for blunt bow forms:

$$K_f = \left(\frac{2C B(1 - e_b)}{1 + e_b} \right)^{0,9} \tan(\gamma_s)^{-0,9(1 + e_b)}$$

= for wedge bow forms ($\alpha_s < 80$ deg), $e_b = 1$ and the above simplifies to:

~~$$K_f = \left(\frac{\tan(\alpha)}{\tan^2(\gamma_s)} \right)^{0,9}$$~~

$$K_f = \left(\frac{\tan(\alpha_s)}{\tan^2(\gamma_s)} \right)^{0,9}$$

α_s = waterline angle measured in way of the stem at the upper ice waterline (UIWL), in degrees, see Fig. 2.10.7

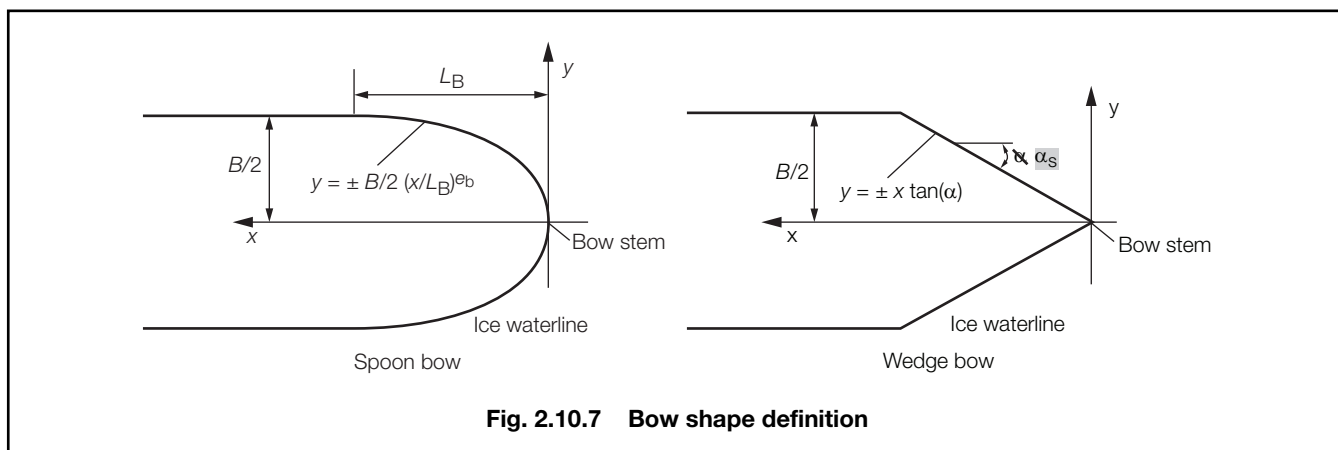


Fig. 2.10.7 Bow shape definition

10.21 Design vertical ice bending moment

10.21.1 The design vertical ice bending moment, M_I , along the hull girder is to be taken as:

$$M_I = 0,1 C_m L \sin^{-0,2}(\gamma_s) F_{IB} \text{ MNm}$$

where

L = ship length (as defined in Pt 3, Ch 1,6.1.1), as defined in Pt 3, Ch 1,6.1.1, but measured on the upper ice waterline (UIWL), in metres

γ_{stem} = as given in 10.19.1

F_{IB} = design vertical ice force at the bow, in MN

C_m = longitudinal distribution factor for design vertical ice bending moment to be taken as follows:

$C_m = 0,0$ at the aft end of L

$C_m = 1,0$ between $0,5L$ and $0,7L$ from aft

$C_m = 0,3$ at $0,95L$ from aft

$C_m = 0,0$ at the forward end of L

Intermediate values are to be determined by linear interpolation.

Where applicable, draught dependent quantities are to be determined at the waterline corresponding to the loading condition under consideration.

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